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Raff et al.

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(54) **ELECTRONIC DEVICES WITH FLEXIBLE
DISPLAYS HAVING FASTENED BENT EDGES**

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361/679.55, 679.56, 679.41

See application file for complete search history.

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(56) **References Cited**

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U.S. PATENT DOCUMENTS

4,066,855 A 1/1978 Zenk
4,085,302 A 4/1978 Zenk et al.

(Continued)

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
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FOREIGN PATENT DOCUMENTS

JP 2000163031 6/2000
JP 2002342033 11/2002

OTHER PUBLICATIONS

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Martisauskas et al., U.S. Appl. No. 13/229,120, filed Sep 9, 2011.

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(Continued)

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G06F 1/16 (2006.01)

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(57) **ABSTRACT**

An electronic device may be provided with a display having a flexible substrate with fastened bent edges. The flexible substrate may have an active region that includes an array of light-emitting elements such as organic light-emitting diodes. The flexible substrate may also have inactive regions that lie outside of the active region. The bent edges may include portions of the inactive regions and portions of the active region. The bent edges may be wrapped to conform to the shape of an internal support structure. The bent edges may be fastened to the support structure with fastening members that attach a housing member or an internal clamp to the support structure. The bent edges may be secured between the housing member or the internal clamp and the support structure. The fastening members may be engaged in openings in the support structure and may pass through or alongside the bent edges.

19 Claims, 11 Drawing Sheets

